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Applicant(s): Farquhar *et al.*

Examiner: Goff II, John L.

Serial No.: 09/781,730

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For: **SEMICONDUCTOR DEVICE HAVING A THERMOSET-CONTAINING
DIELECTRIC MATERIAL AND METHODS FOR FABRICATING THE SAME**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF OF APPELLANTS

This Appeal Brief, pursuant to the Notice of Appeal filed May 5, 2003, is an appeal from the rejection of the Examiner dated February 4, 2003.

REAL PARTY IN INTEREST

International Business Machines, Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 23-25, 29, 31-33, 35-37, 39-43 and 45-49 are currently pending.

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STATUS OF AMENDMENTS

There are no After-Final Amendments which have not been entered.

SUMMARY OF INVENTION

The present invention discloses a method for forming a device, comprising the following steps: providing a fluoropolymer matrix having particles therein (see specification, page 6, lines 18-20); coating a thermosetting resin on the fluoropolymer matrix (see specification, page 8, lines 18-20); processing the fluoropolymer matrix with the resin coated thereon such that material from the resin impregnates the fluoropolymer matrix, leaving a remaining layer of resin on a surface of the fluoropolymer matrix, wherein the remaining layer of resin comprises material of the resin that has not impregnated the fluoropolymer matrix (see specification, page 10, lines 1-8); and laminating the resin-impregnated fluoropolymer matrix to a conductor, wherein the conductor and the remaining layer of resin are disposed on opposite sides of the resin-impregnated fluoropolymer matrix following the laminating step (see specification, page 12, lines 14-15; see FIGS. 2B, 5, and 6).

The fluoropolymer matrix may be nonfibrillated polytetrafluoroethylene (see specification, page 6, line 22 - page 7, line 1).

The particles may be inorganic particles (see specification, page 6, lines 18-20).

The conductor may be copper (see specification, page 13, line 7).

The thermosetting resin may include a contrasting dye (see specification, page 10, lines 8-11).

The device may be a printed circuit board (see specification, page 15, lines 6-8).

The device may be a chip carrier (see specification, page 19, lines 19-20).

The thermosetting resin may include solvent (see specification, page 9, lines 20-23) .

The method may further comprise the step of heating the coated fluoropolymer matrix to remove the solvent from the thermosetting resin, prior to the laminating step (see specification, page 10, line 23 - page 11, line 4).

The method may further comprise the step of subjecting the fluoropolymer matrix to a plasma process, prior to the coating step (see specification, page 11, lines 9-10).

The thermosetting resin may contain about 30-75 percent solids (see specification, page 9, line 23 - page 10, line 1).

The laminating step may comprises applying heat and pressure; the heat may be applied at 120-250° C and the pressure may applied at 100-700 PSI (see specification, page 14, lines 8-12).

The fluoropolymer matrix may be impregnated with the thermosetting resin prior to the step of providing a fluoropolymer matrix having particles therein (see specification, page 19, line 18 - page 14, line 2).

The method may further comprise the step of: coating the conductor with the thermosetting resin, prior to the laminating step (see specification, page 12, line 21 - page 13, line 1; page 13, lines 10-11); and heating the coated conductor to remove the solvent from the thermosetting resin (see specification, page 18, line 13 - page 19, line 6).

The inorganic particles may be evenly distributed throughout the fluoropolymer matrix (see specification, page 11, lines 13-20).

The inorganic particles may be spherical in shape; the organic particles may have a diameter of less than about 10 microns (see specification, page 7, line 23 - page 8, line 3).

The thermosetting resin may comprise inorganic particles, wherein the inorganic particles of the thermosetting resin do not impregnate the fluoropolymer matrix during the processing (see specification, page 10, lines 1 - 8, line 1).

ISSUES

1. Whether claim 48 is unpatentable under 35 U.S.C. §112, second paragraph.
2. Whether claims 23, 25, 29, 32, 35, 36, 40-43, and 45 under 35 U.S.C. §102(b) are unpatentable over Johnson (US Patent 4,747,897).
3. Whether claims 24, 33, and 46-48 under 35 U.S.C. §103(a) are unpatentable over Johnson and further in view of the admitted prior art (Specification pages 1-3 and page 8, lines 10-13).
4. Whether claim 37 under 35 U.S.C. §103(a) is unpatentable over Johnson, and further in view of Ueno et al. (U.S. Patent 4,765,860) and Kusano et al. (U.S. Patent 5,425,832).
5. Whether claims 31, 39, and 49 under 35 U.S.C. §103(a) are unpatentable over Johnson and further in view of Kodokian (U.S. Patent 5,762,741).

GROUPING OF CLAIMS

There is only one claim at issue, namely claim 48, with respect to the rejection under 35 U.S.C. §112, second paragraph.

The claims are divided into the following groups with respect to the rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a):

Group	Claims	Do Claims Stand and Fall Together?
1	23-25, 29, 32-33, 40-42, 46-49	Yes
2	35-36, 45	Yes
3	31, 37, 39, 43	No

The claims of Group 1 stand and fall together. The claims of Group 2 stand and fall together. The claims of Group 3 do not stand and fall together.

The claims of Group 2 do not stand and fall together with the claims of Group 1 and the claims of Group 3, because the following issue relating to the claims of Group 2 (i.e., claims 35-36 and 45) is not an issue for any other claim under appeal: “wherein the thermosetting resin includes solvent”.

Claim 31 does not stand and fall together with any other claim under appeal, because the following issue relating to claim 31 is not an issue for any other claim under appeal: “wherein the thermosetting resin includes a contrasting dye”.

Claim 37 does not stand and fall together with any other claim under appeal, because the following issue relating to claim 37 is not an issue for any other claim under appeal: “further comprising the step of subjecting the fluoropolymer matrix to a plasma process, prior to the

coating step”.

Claim 39 does not stand and fall together with any other claim under appeal, because the following issue relating to claim 39 is not an issue for any other claim under appeal: “wherein the thermosetting resin contains about 30-75 percent solids”.

Claim 43 does not stand and fall together with any other claim under appeal, because the following issue relating to claim 43 is not an issue for any other claim under appeal: “wherein the fluoropolymer matrix is impregnated with the thermosetting resin, prior to the providing step”.

ARGUMENT

Issue 1

CLAIM 48 IS NOT UNPATENTABLE UNDER 35 U.S.C. §112, SECOND PARAGRAPH.

The Examiner rejected claim 48 as allegedly unpatentable under 35 U.S.C. §112, second paragraph. The Examiner alleged that “[t]he term ‘about’ in claim 48 is a relative term which renders the claim indefinite. The term ‘about’ is not defined in the claim, the specification does not provide a standard for ascertaining the degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear as to the tolerance ‘about’ gives to the diameter. It is suggested to delete ‘about’ from the claim.”

In response, Appellants respectfully contend that claims containing ‘about’ are regularly issued by the United States Patent and Trademark Office, and thousands if not hundreds of thousands of claims containing ‘about’ exist in issued patents, wherein the specification does not provide explicit information for ascertaining the scope of ‘about’.

For example, Appellants cite the following 10 patents issued on June 24, 2003 in which

claims use 'about' wherein the specification does not provide explicit information for ascertaining the scope of 'about':

U.S. Patent Number	Claim	Claim Limitation
6,584,434	1	"about one hertz"
6,584,406	38	"about said predetermined time"
6,584,404	7	"about once a second"
6,584,372	7	"a range of about 0.2 to about 0.3"
6,584,362	1	"spaced about 120 degrees apart"
6,584,359	1	"a cycle time of about 12.8 seconds"
6,584,358	15	"about 122 Hz"
6,584,349	1	"about 0.1 mil"
6,584,304	10	"about 100 ns"
6,584,294	14	"between about 2 and about 3 atmospheres"

The preceding data for 10 issued patents is for only one day (June 24, 2003) of issued patents and is based on searching and analyzing only 30 out of more than 300 possible patents issued on June 24, 2003 having the word 'about' in a claim.. Based on extrapolation from the preceding data, Appellants could therefore expect to find at least *about* 100 issued patents on June 24, 2003 and least *about* 5000 issued patents in the year immediately preceding June 24, 2003, wherein said issued patents are characterized by 'about' in a claim, and wherein the specification does not provide explicit information for ascertaining the scope of 'about'. Therefore, Appellants contend that the Examiner's rejection of claim 48 under 35 U.S.C. §112, second paragraph, based on appearance of 'about' in claim 48, is overwhelmingly inconsistent with the preceding data and is strikingly contrary to the established policy and practice of the United States Patent and Trademark Office.

For legal support, Appellants cite *Syntex v. Paragon Optical Inc.*, 7 U.S.P.Q.2d (BNA)

1001, 1038 (D. Ariz. 1987):

The descriptive term "about", which is used to explain the claimed ranges in the patents in suit, does not render a claim indefinite [*140] under 35 U.S.C. § 112. *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1557 (Fed. Cir. 1983).

Under 35 U.S.C. § 112 the term "about" entitles the patentee to a broad interpretation of any range claimed in the patent.

"About" is not broad or arbitrary but rather is a flexible term with a meaning similar to "approximately". *Ex parte Eastwood*, 163 U.S.P.Q. 316, 317 (C.C.P.A. 168).

As a matter of law, the term "about" is a "clear warning that exactitude is not claimed but rather a contemplated variation. *Kolene Corp. v. Motor City Metal Treating, Inc.*, 307 F. Supp. 1251, 1258 (E.D. Mich. 1969), *aff'd*, 440 F.2d 77 (6th Cir. 1971), *cert. denied*, 404 U.S. 886 (1971).

Based on the preceding arguments, Appellants contend that the rejection of claim 48 under 35 U.S.C. §112, second paragraph is improper and should be reversed.

Issue 2

CLAIMS 23, 25, 29, 32, 35, 36, 40-43, and 45 UNDER 35 U.S.C. §102(B) ARE NOT UNPATENTABLE OVER JOHNSON (US PATENT 4,747,897).

The Examiner rejected claims 23, 25, 29, 32, 35, 36, 40-43, and 45 under 35 U.S.C. §102(b) as allegedly unpatentable over Johnson (US Patent 4,747,897).

Claim 23

Appellants contend that Johnson does not teach the combination of the following first and second features of claim 23:

“processing the fluoropolymer matrix with the resin coated thereon such that material from the resin impregnates the fluoropolymer matrix, leaving a remaining layer of resin on a surface of the fluoropolymer matrix, wherein the remaining layer of resin comprises material of the resin that has not impregnated the fluoropolymer matrix”; and

“laminating the resin-impregnated fluoropolymer matrix to a conductor, wherein the conductor and the remaining layer of resin are disposed on opposite sides of the resin-impregnated fluoropolymer matrix following the laminating step”.

Thus, the remaining layer of resin created in the “processing” step must exist and be disposed on opposite sides of the resin-impregnated fluoropolymer matrix following the “laminating” step [of] “laminating the resin-impregnated fluoropolymer matrix to a conductor”.

The Examiner recites the following argument to support the Examiner’s allegation that Johnson teaches the preceding features of claim 23. After a resin impregnated dielectric sheet is formed, the Examiner states: “The sheet is then bonded between one or two sheets of copper foil (Column 4, lines 59-63 and Column 6, lines 4753). ... It is noted a layer of resin is present on each surface of the dielectric material (bonded or not) after lamination (Column 8, lines 1-4).”

Applicants contend that the preceding argument by the Examiner is not persuasive, because a layer of resin is not present on each surface of the dielectric material after the step of “laminating the resin-impregnated fluoropolymer matrix to a conductor”. Appellants contend that the resin layer referred to by the Examiner allegedly on each surface of the dielectric material (as deduced by the Examiner from Johnson, col. 8 lines 1-4) was generated by C-stage curing as described by Johnson, col. 7, lines 64-67. However, Johnson makes it clear that C-staged curing

results in distributing the resin homogeneously within the fluoropolymer matrix. See Johnson, col. 6, lines 47-52 ("FIG. 2 shows a stack of the pre-preg sheets 30 of the invention with a metal foil 32, preferably copper, placed above and below the sheets 30. On application of heat and pressure as depicted in FIG. 3, the resin in pre-preg sheets 30 is cured to a **homogeneous, C-stage cured state** to form the composite 34 and the metal foils 32 are firmly bonded to the composite 34" (emphasis added)). Appellants contend that it is physically impossible for a "layer" of resin to exist after the resin has been homogeneously distributed within the fluoropolymer matrix. The Examiner rebuts this point by relying on Johnson, col. 8 lines 1-4 which states: "Microscopic examination of cross sections of the laminated composite showed a uniform distribution of epoxy resin around the fibers, within the interstices of the fabric and between the layers of fabric."

From the preceding discussion, the pertinent issue is whether the "uniform distribution of epoxy resin ... between the layers of fabric" recited in Johnson, col. 8 lines 1-4 represents "a remaining layer of resin ... disposed on opposite sides of the resin-impregnated fluoropolymer matrix following the laminating step". Appellants maintain that no such alleged remaining layer of resin exists after the C-staged curing. Definitionally, a layer must have thickness.¹ Appellants maintain that there is essentially no thickness existing between the layers of fluoropolymer fabric following the C-staged curing, as indicated in Johnson, col. 7, line 64 - col. 8, line 1: "The laminated composite was fully cured to the C-stage state, was approximately 0.45 inches thick

¹ The New Lexicon Webster's Dictionary of the English language 561 (1988 ed.) ("one thickness, coating, etc. of one or more substances lying upon or under one or more other substances"); Webster's New Collegiate Dictionary 477 (2d ed. 1958) ("one thickness, coarse, or fold laid over or under another")

and exhibited excellent resin wetting throughout the composite. There was no evidence of air entrapment, blistering, resin voids or delamination between the layers of fabric.”

However, the Examiner has cited Johnson, col. 8 lines 1-4 as disclosing a “**uniform** distribution of epoxy resin around the fibers ... between the layers of fabric” (emphasis added). Appellants maintain that the key to interpreting said “**uniform** distribution of epoxy resin ... between the layers of fabric” is to recognize that the phrase “uniform distribution” is consistent with a “homogeneous, C-stage cured state” recited in Johnson, col. 6, lines 47-52, cited *supra* by Appellants. Said “uniform distribution” exists “around the fibers” not only between the fluoropolymer fabric layers but also exists “around the fibers” within any cross-section of any fluoropolymer fabric layer as a consequence of the homogeneous distribution of resin “around the fibers” generated by the C-staged curing. Thus, the “uniform distribution of epoxy resin around the fibers” disclosed in Johnson, col. 8 lines 1-4 is not a layer but is instead a plane of homogeneously distributed resin “around the fibers” that is no different than any other plane of homogeneously distributed resin “around the fibers” in any other cross-section within any fluoropolymer fabric layer following the C-staged curing.

Additionally and most importantly, Appellants contend that the Examiner’s reliance on Johnson, col. 8 lines 1-4 is misdirected. Appellants contend that Johnson, col. 8 lines 1-4 is the last descriptive text relating to Johnson’s “EXAMPLE 1” beginning on col. 7, line 11 and ending on col. 8, line 4. Johnson’s EXAMPLE 1 does not include “laminating the resin-impregnated fluoropolymer matrix to a **conductor**” (emphasis added) as required by claim 23. Johnson does not disclose anywhere that laminating to as conductor occurs in EXAMPLE 1. In fact, Johnson

specifically discloses that laminating to as conductor does not occur in EXAMPLE 1 in the opening sentence of Johnson's EXAMPLE 2 beginning on col. 8, line 7: "The same conditions and materials of Example I were used, except that the stack of pre-preg sheets was placed between sheets of 0.0014 inch thick copper foil instead of the FEP release sheets." Therefore Johnson, col. 8 lines 1-4, which the Examiner's relies on for proving anticipation of claim 23, is not applicable to "laminating the resin-impregnated fluoropolymer matrix to a **conductor**" (emphasis added) as required by claim 23. Accordingly, Appellants contend that the Examiner's argument in relation to claim 23 is not persuasive.

Based on the preceding arguments, Applicants respectfully maintain that Johnson does not anticipate claim 23, and that claim 23 is in condition for allowance. Accordingly, Appellants respectfully request reversal of the rejection of claim 23 under 35 U.S.C. §102(b).

Claims 25, 29, 32, and 40-42

Since claims 25, 29, 32, and 40-42 depend from claim 23, which Appellants has argued *supra* is not anticipated by Johnson, Appellants contend that claims 25, 29, 32, and 40-42 are likewise not anticipated by Johnson, and the rejection of claims 25, 29, 32, and 40-42 under 35 U.S.C. §102(b) should accordingly be reversed.

Claim 35

Since claim 35 depends from claim 23, which Appellants has argued *supra* is not anticipated by Johnson, Appellants contend that claim 35 is likewise not anticipated by Johnson,

and the rejection of claim 35 under 35 U.S.C. §102(b) should accordingly be reversed.

In addition, Johnson does not disclose the following feature of claim 35: “wherein the thermosetting resin includes solvent”. The Examiner admits: “It is further noted Johnson does not specifically recite a solvent included in the thermosetting resin.” However, the Examiner alleges: “after coating the dielectric material with thermosetting resin Johnson performs a B-stage cure, thus the resin would inherently include a solvent.” Appellant disagrees with the Examiner’s position that “the resin would inherently include a solvent.” For support, Appellant cites United States Patent 4,495,017 (Abe et al. 1985) to establish that: it was known to perform a B-stage cure on a resin dissolved in a solvent (see Abe, col. 1, lines 22-62); and it was also known to perform a B-stage cure on a resin without a solvent (see Abe, col. 1, line 63 - col. 3, line 31). Therefore, since it was known to perform a B-stage cure on a resin without a solvent, Appellants maintain that it is not inherent for the resin to include a solvent as alleged by the Examiner.

Based on the preceding arguments, Applicants respectfully maintain that Johnson does not anticipate claim 35, and that claim 35 is in condition for allowance. Accordingly, Appellants respectfully request reversal of the rejection of claim 35 under 35 U.S.C. §102(b).

Claims 36 and 45

Since claims 36 and 45 depend from claim 35, which Appellants has argued *supra* is not anticipated by Johnson, Appellants contend that claims 36 and 45 are likewise not anticipated by Johnson, and the rejection of claims 36 and 45 under 35 U.S.C. §102(b) should accordingly be reversed.

Claim 43

Since claim 43 depends from claim 23, which Appellants has argued *supra* is not anticipated by Johnson, Appellants contend that claim 43 is likewise not anticipated by Johnson, and the rejection of claim 43 under 35 U.S.C. §102(b) should accordingly be reversed.

In addition, Johnson does not disclose the following feature of claim 43: “wherein the fluoropolymer matrix is impregnated with the thermosetting resin, **prior to the providing step**” (emphasis added).

Additionally, the Examiner has not made even a single argument to show that Johnson teaches the following feature of claim 43: “wherein the fluoropolymer matrix is impregnated with the thermosetting resin, **prior to the providing step**” (emphasis added).

Accordingly, Appellants contend that claim 43 is not anticipated by Johnson, and the rejection of claim 43 under 35 U.S.C. §102(b) should accordingly be reversed.

Issue 3

CLAIMS 24, 33, AND 46-48 UNDER 35 U.S.C. §103(A) ARE NOT UNPATENTABLE OVER JOHNSON AND FURTHER IN VIEW OF THE ADMITTED PRIOR ART (SPECIFICATION PAGES 1-3 AND PAGE 8, LINES 10-13).

The Examiner rejected claims 24, 33, and 46-48 under 35 U.S.C. §103(a) as allegedly unpatentable over Johnson and further in view of the admitted prior art (Specification pages 1-3 and page 8, lines 10-13).

Since claims 24, 33, and 46-48 depend from claim 23, which Appellants has argued *supra* is not unpatentable under 35 U.S.C. §102(b), Appellants contend that claims 24, 33, and 46-48 are likewise not unpatentable over Johnson in view of the admitted prior art, and the rejection of claims 24, 33, and 46-48 under 35 U.S.C. §103(a) should accordingly be reversed.

Issue 4

CLAIM 37 UNDER 35 U.S.C. §103(A) IS NOT UNPATENTABLE OVER JOHNSON, AND FURTHER IN VIEW OF UENO ET AL. (U.S. PATENT 4,765,860) AND KUSANO ET AL. (U.S. PATENT 5,425,832).

The Examiner rejected claim 37 under 35 U.S.C. §103(a) as allegedly unpatentable over Johnson, and further in view of Ueno et al. (U.S. Patent 4,765,860) and Kusano et al. (U.S. Patent 5,425,832).

Since claim 37 depends from claim 23, which Appellants has argued *supra* is not unpatentable under 35 U.S.C. §102(b), Appellants contend that claim 37 is likewise not unpatentable under 35 U.S.C. §103(a) over Johnson in view of Ueno or Kusano, and claim 37 should accordingly be reversed.

In addition, Johnson in view of Ueno or Kusano does not disclose the following feature of claim 37: “further comprising the step of subjecting the fluoropolymer matrix to a plasma process, prior to the coating step”. The Examiner admits that “Johnson does not teach ... subjecting the PTFE matrix to a plasma process prior to coating.” However, the Examiner alleges: “It is well known in the art when bonding a PTFE matrix to a conductive material to first subject the PTFE matrix to a plasma process to provide the PTFE matrix with a hydrophilic surface thereby enhancing adhesion between the PTFE matrix and the conductor as shown for example by Ueno et al. and Kusano et al. One of ordinary skill in the art at the time the invention was made reading Johnson in view of Ueno et al. and Kusano et al. would have readily appreciated modifying the method taught by Johnson to incorporate the well known plasma discharge technique shown for example by Ueno et al. and Kusano et al. to provide the PTFE matrix with a hydrophilic surface thus enhancing the adhesion between the PTFE matrix and the conductor.”

In response to the preceding argument by the Examiner, Appellants contend that the Examiner's argument for modifying Johnson with said plasma process prior to coating with a resin is not persuasive, because Ueno and Kusano discuss the plasma process as an improvement to chemical and mechanical bonding methods (see Ueno, col. 1, line 16 - col. 2, line 4; Kusano, col. 1, lines 27-37). Neither Ueno nor Kusano discuss bonding the resin-treated fluoropolymer to a conductor by B-stage curing and subsequent C-stage curing. Johnson teaches, however, that bonding the resin-treated fluoropolymer to a conductor (prior to coating with a resin) by B-stage curing and subsequent C-stage curing is simpler to apply, and less expensive, than said plasma process. Accordingly, it would not be obvious for a person of ordinary skill in the art to modify Johnson with said plasma process prior to coating with a resin.

Based on the preceding arguments, Applicants maintain that claim 37 is not unpatentable under 35 U.S.C. §103(a), and claim 37 should accordingly be reversed

Issue 5

CLAIMS 31, 39, AND 49 UNDER 35 U.S.C. §103(A) ARE NOT UNPATENTABLE OVER JOHNSON AND FURTHER IN VIEW OF KODOKIAN (U.S. PATENT 5,762,741).

The Examiner rejected claims 31, 39, and 49 under 35 U.S.C. §103(a) as allegedly unpatentable over Johnson and further in view of Kodokian (U.S. Patent 5,762,741).

Claim 31

Since claim 31 depends from claim 23, which Appellants has argued *supra* is not unpatentable under 35 U.S.C. §102(b), Appellants contend that claim 31 is likewise not

unpatentable under 35 U.S.C. §103(a) over Johnson in view of Kodokian, and claim 31 should accordingly be reversed.

In addition, Johnson in view of Kodokian does not disclose the following feature of claim 31: “wherein the thermosetting resin includes a contrasting dye”. The Examiner admits that Johnson does not teach a thermosetting resin that includes a contrasting dye” However, the Examiner alleges: “it is known in the art to use a thermosetting resin with filler material to bond a PTFE matrix to a conductor as shown for example by Kodokian. One of ordinary skill in the art at the time the invention was made reading Johnson in view of Kodokian would have readily understood using a thermosetting resin in the method taught by Johnson that includes filler materials which would have included dyes as suggested by Kodokian as only the expected results would be achieved.”

In response to the preceding argument by the Examiner, Appellants contend that the Examiner’s argument for modifying Johnson with inclusion of a contrasting dye with the thermoset resin is not persuasive, because: Kodokian does not teach or suggest a thermosetting resin that includes a contrasting dye; and the Examiner has not provided a reason for modifying Johnson with Kodokian.

Based on the preceding arguments, Applicants maintain that claim 31 is not unpatentable under 35 U.S.C. §103(a), and claim 31 should accordingly be reversed

Claim 39

Since claim 39 depends from claim 23, which Appellants has argued *supra* is not unpatentable under 35 U.S.C. §102(b), Appellants contend that claim 39 is likewise not

unpatentable under 35 U.S.C. §103(a) over Johnson in view of Kodokian, and claim 39 should accordingly be reversed.

In addition, Johnson in view of Kodokian does not disclose the following feature of claim 39: “ wherein the thermosetting resin contains about 30-75 percent solids”. The Examiner admits that Johnson does not teach a thermosetting resin includes 30-75 percent solids”. However, the Examiner alleges: “one of ordinary skill in the art at the time the invention was made would have readily understood that when using a liquid thermosetting resin as taught by Johnson the resin would have included less than 100% solids.”

In response to the preceding argument by the Examiner, Appellants contend that the Examiner’s argument for modifying Johnson with inclusion of 30-75 percent solids with the thermoset resin is not persuasive, because one of ordinary skill in the art at the time the invention was made would not have readily understood that when using liquid thermosetting resin as taught by Johnson the resin would have included no more than 75% solids.

Based on the preceding arguments, Applicants maintain that claim 39 is not unpatentable under 35 U.S.C. §103(a), and claim 39 should accordingly be reversed.

Claim 49

Since claim 49 depends from claim 23, which Appellants has argued *supra* is not unpatentable under 35 U.S.C. §102(b), Appellants contend that claim 49 is likewise not unpatentable under 35 U.S.C. §103(a) over Johnson in view of Kodokian, and claim 49 should accordingly be reversed.

SUMMARY

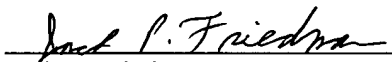
In summary, Applicants respectfully request reversal of the rejection of:

claim 48 under 35 U.S.C. §112, second paragraph;

claims 23, 25, 29, 32, 35, 36, 40-43, and 45 under 35 U.S.C. §102(b); and

claims 24, 33, 46-48, 37, 31, 39, and 49 under 35 U.S.C. §103(a).

Respectfully submitted,



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DIELECTRIC MATERIAL AND METHODS FOR FABRICATING THE SAME

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APPENDIX - CLAIMS ON APPEAL

23. A method for forming a device, comprising the following steps:

providing a fluoropolymer matrix having particles therein;

coating a thermosetting resin on the fluoropolymer matrix;

processing the fluoropolymer matrix with the resin coated thereon such that material from the resin impregnates the fluoropolymer matrix, leaving a remaining layer of resin on a surface of the fluoropolymer matrix, wherein the remaining layer of resin comprises material of the resin that has not impregnated the fluoropolymer matrix; and

laminating the resin-impregnated fluoropolymer matrix to a conductor, wherein the conductor and the remaining layer of resin are disposed on opposite sides of the resin-impregnated fluoropolymer matrix following the laminating step.

24. The method of claim 23, wherein the fluoropolymer matrix is nonfibrillated polytetrafluoroethylene.
25. The method of claim 23, wherein the particles are inorganic particles.
29. The method of claim 23, wherein the conductor is copper.
31. The method of claim 23, wherein the thermosetting resin includes a contrasting dye.
32. The method of claim 23, wherein the device is a printed circuit board.
33. The method of claim 23, wherein the device is a chip carrier.
35. The method of claim 23, wherein the thermosetting resin includes solvent.
36. The method of claim 35, further comprising the step of heating the coated fluoropolymer matrix to remove the solvent from the thermosetting resin, prior to the laminating step.
37. The method of claim 23, further comprising the step of subjecting the fluoropolymer matrix to a plasma process, prior to the coating step.
39. The method of claim 23, wherein the thermosetting resin contains about 30-75 percent solids.

40. The method of claim 23, wherein the laminating step comprises applying heat and pressure.
41. The method of claim 40, wherein the heat is applied at 120-250° C during the laminating step.
42. The method of claim 40, wherein the pressure is applied at 100-700 PSI during the laminating step.
43. The method of claim 23, wherein the fluoropolymer matrix is impregnated with the thermosetting resin, prior to the providing step.
45. The method of claim 35, further comprising the steps of:
- coating the conductor with the thermosetting resin, prior to the laminating step; and
 - heating the coated conductor to remove the solvent from the thermosetting resin.
46. The method of claim 25, wherein the inorganic particles are evenly distributed throughout the fluoropolymer matrix.
47. The method of claim 25, wherein the inorganic particles are spherical in shape.
48. The method of claim 47, wherein the inorganic particles have a diameter of less than about 10 microns.

49. The method of claim 23, wherein the thermosetting resin comprises inorganic particles, and wherein the inorganic particles of the thermosetting resin do not impregnate the fluoropolymer matrix during the processing step.

AA 1700

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
EN9-98-122US3

In Re Application Of: Farquhar et al.

JUN 30 2003

Serial No.
09/781,730

Filing Date
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Examiner
Goff II, John L.

Group Art Unit
1733

Invention: SEMICONDUCTOR DEVICE HAVING A THERMOSET-CONTAINING DIELECTRIC MATERIAL
AND METHODS FOR FABRICATING THE SAME

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TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on
May 5, 2003

The fee for filing this Appeal Brief is: \$320.00

- ☐ A check in the amount of the fee is enclosed.
- ☒ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 09-0457(IBM)

Jack P. Friedman
Signature

Dated: 6/26/2003

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I certify that this document and fee is being deposited
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